

LINEAR PREDICTION BASED INITIALIZATION OF SINGLE-AXIS BLIND EQUALIZATION FOR VSB SIGNALS

ABSTRACT OF THE DISCLOSURE

A single-axis receiver processing, for example, complex vestigial sideband modulated
5 signals with an equalizer with forward and feedback filters. Forward and feedback filters have
parameters that are initialized and adapted to steady state operation. Adaptive equalization
employs linear predictive filtering and error term generation based on various cost criteria.
Adaptive equalization includes recursive update of parameters for forward and feedback filtering
as operation changes between linear and decision-feedback equalization of either single or multi-
10 channel signals. An adaptive, linear predictive filter generates real-valued parameters that are
employed to set the parameters of the feedback filter. In an initialization mode, filter parameters
are set via a linear prediction filter to approximate the inverse of the channel's impulse/frequency
response and a constant modulus error term for adaptation of the filter parameters. In an
acquisition mode, equalization is as linear equalization with a constant modulus error term, and
15 possibly other error terms in combination, for adaptation of the filter parameters. In a tracking
mode, equalization is as decision feedback equalization with decision-directed error terms for
adaptation of the filter parameters. For some equalizer configurations, feedback filtering is
applied to real-valued decisions corresponding to complex-valued received data, and includes
real-part extraction of the error term employed for recursive update of filtering parameters.
20 Where a training sequence is available to the receiver, initial parameters for forward filtering are
estimated by correlation of the received signal with the training sequence.